How Much Does It Hold?

Reporting Category Measurement

Topic Measuring volume with nonstandard units

Primary SOL 1.9 The student will use nonstandard units to measure length, weight/mass, and volume.

Materials

- Two clear jars or bottles of different sizes
- Chart with outlines of the two jars
- Pitcher
- Dry rice
- Two identical, see-through measuring containers (e.g., large measuring cups, graduated cylinders)

Vocabulary

more, less, least, most, equivalent, equal, volume

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Introduce the lesson by showing students two different size jars or bottles (e.g., a peanut butter jar, a jelly jar, an olive jar). Explain that they will be exploring various containers to determine which jar holds the greatest amount.
2. Give each student the opportunity to predict which jar will hold the most rice. Indicate the students' predictions with tally marks on the chart showing the outlines of the two different sized containers.
3. Once the choices have been recorded, discuss the predictions. Show students how to measure the amount of rice that each of the two clear jars can hold by filling each container with rice from the pitcher. Then, pour the rice from each jar into one of two identical, see-through measuring containers. Have students indicate which measuring container has the greatest amount of rice and which has the least. Keep each measuring container paired with the jar its rice came from.
4. Have students check to see if their predictions shown on the chart were correct. Lead students in a discussion of comparing and contrasting volume by asking questions such as, "Which container held the most? The least?" Extend student thinking with the following questions: "How much more? How much less? Could the results be different at another time?"
5. At the end of the lesson, direct students to write in their math journals a description of the experiment, including their own prediction and the results. Note students' use of terminology such *as more, less,* and *equivalent* and level of understanding as articulated in their writing.

Assessment

- **Questions**
  - "Could a tall, skinny container hold as much rice (or water) as a small, fat container? Why, or why not?"
  - Think about a time you have gone to the grocery store with your family. "Why do different things come packaged in different sized containers? Can you give an example of something that comes in a large container? In a small container?"
- **Journal/Writing Prompts**
  - "You own a shoe store that sells baby, children's and adult shoes. Why, or why not, would you use the same size box for every pair of shoes you sell?"
  - "There are two containers that are the exact same size, and one was filled with pennies, while the other is filled with dimes. Which one would you rather have? Why?"
- **Other**
  - Throughout this activity, encourage mathematical discussion and communication as a means of provoking student thought. Note the students' questions and observations.

Extensions and Connections (for all students)

- Place different size containers and dried beans in the math center for students to experiment to see whether two containers hold equivalent amounts or whether one container holds *more than* or *less than* the other. They may do this by pouring beans from one to another. (Note: This needs to be modeled by the teacher before students work on their own.) Students should record their results in their math journals.
- Estimation jars provide a good opportunity for students to think about volume. Use jars that are the same size to help students compare the volumes of various materials (e.g., large and small marshmallows), and discuss the students' observations and estimations.

Strategies for Differentiation

- When using an estimation jar, pour a "benchmark" amount of rice (e.g., 1 scoop) into a bag and display next to the larger container of rice to help support the students' development of estimation skills.
- Provide a sentence frame such as, "The (container one) holds <u>(more than / less than / the same as)</u> the (container two)."
- Provide a chart with pictorial representations of the concepts of more than, less than, equal to, and the same as.